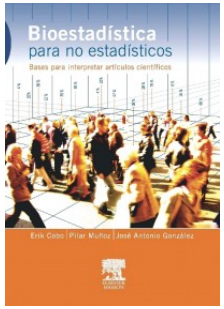
ANY INTERNACIONAL DE LA BIOLOGIA MATEMÀTICA

GUIA DE LECTURA

El 2018 ha estat proclamat l'**Any Internacional de la Biologia Matemàtica** en una iniciativa conjunta de la *European Mathematical Society* (EMS) i la *European Society for Mathematical and Theoretical Biology* (ESMTB).

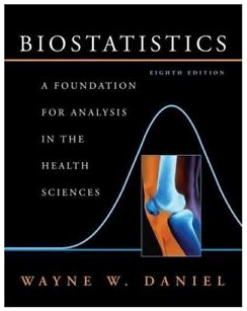
L'objectiu principal d'aquesta celebració és potenciar l'increment de les aplicacions de les matemàtiques a la biologia i a les ciències de la vida; així com fomentar aquesta retroalimentació en els pròxims anys.

La Biblioteca de l'FME i la Biblioteca del Campus de Terrassa, amb la col·laboració del professor Toni Guillamon, exposen llibres sobre biologia matemàtica per donar suport a aquesta efemèride. Durant el mes de **juny** l'exposició es podrà veure a la **Biblioteca de l'FME** i el mes de **novembre** a la **Biblioteca del Campus de Terrassa**.



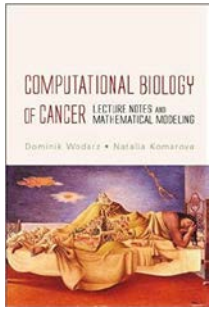
BIOESTADISTICA PARA NO ESTADÍSTICOS: BASES PARA INTERPRETAR UN ESTUDIO CIENTÍFICO. Erik Cobo, Pilar Muñoz, José Antonio González

La obra se presenta como un manual práctico en donde se recogen desde los principios y conceptos básicos de la estadística hasta los diferentes diseños bajo los que se puede llevar a cabo un ensayo clínico, todo ello desde un punto de vista finalista.



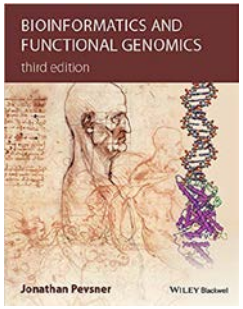
BIOSTATISTICS: A FOUNDATION FOR ANALYSIS IN THE HEALTH SCIENCES. Wayne W. Daniel

This edition requires few mathematical prerequisites. Only reasonable proficiency in algebra is required for an understanding of the concepts and methods underlying the calculations. The emphasis continues to be on an intuitive understanding of principles rather than an understanding based on mathematical sophistication. For most of the statistical techniques covered in this edition, we discuss the capabilities of one or more software packages (MINITAB, SAS, SPSS, and NCSS) that may be used to perform the calculations needed for their application.



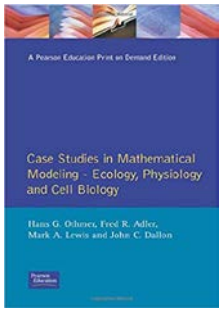
COMPUTATIONAL BIOLOGY OF CANCER: LECTURE NOTES AND MATHEMATICAL MODELING. Dominik Wodarz and Natalia Komarova

The book shows how mathematical and computational models can be used to study cancer biology. It introduces the concept of mathematical modeling and then applies it to a variety of topics in cancer biology. These include aspects of cancer initiation and progression, such as the somatic evolution of cells, genetic instability, and angiogenesis. The book also discusses the use of mathematical models for the analysis of therapeutic approaches such as chemotherapy, immunotherapy, and the use of oncolytic viruses.



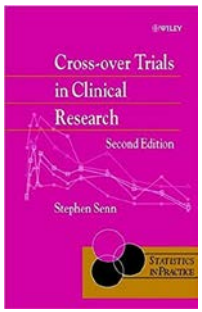
BIOINFORMATICS AND FUNCTIONAL GENOMICS. Jonathan Pevsner

Bioinformatics and Functional Genomics, Third Edition serves as an excellent single-source textbook for advanced undergraduate and beginning graduate-level courses in the biological sciences and computer sciences. It is also an indispensable resource for biologists in a broad variety of disciplines who use the tools of bioinformatics and genomics to study particular research problems; bioinformaticists and computer scientists who develop computer algorithms and databases; and medical researchers and clinicians who want to understand the genomic basis of viral, bacterial, parasitic, or other diseases.



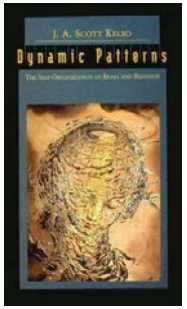
CASE STUDIES IN MATHEMATICAL MODELING: ECOLOGY, PHYSIOLOGY AND CELL BIOLOGY. Hans G. Othmer

Each chapter distills lectures given by a leading researcher during a Special Year in Mathematical Biology at the University of Utah in 1995-96. Authors were asked to provide an in-depth exposition of a crucial problem in their area of expertise. The resulting case studies lead students through the formulation, solution, and interpretation of cutting-edge research, catapulting them directly into the research process. To emphasize the unifying power of mathematical methods in biology, authors, have drawn from three highly active areas of research in the life sciences: ecology, physiology, and cell biology.



CROSS-OVER TRIALS IN CLINICAL RESEARCH. Stephen Senn

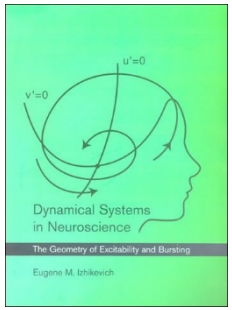
Cross-over trials are an important class of design used in thepharmaceutical industry and medical research, and their usecontinues to grow. Cross-over Trials in Clinical Research, SecondEdition has been fully updated to include the latest methodologyused in the design and analysis of cross-over trials. It includesmore background material, greater coverage of important statisticaltechniques, including Bayesian methods, and discussion of analysisusing a number of statistical software packages. Primarily aimed at statisticians and researchers working in thepharmaceutical industry, the book will also appeal to physiciansinvolved in clinical research and students of medicalstatistics.



DYNAMIC PATTERNS: THE SELF-ORGANITZATION OF BRAIN AND BEHAVIOR. J. A. Scott Kelso

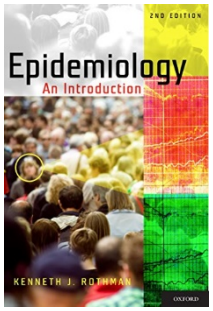
His core thesis is that the creation and evolution of patterned behavior at all levels--from neurons to mind--is governed by the generic processes of self-organization. Both human brain and behavior are shown to exhibit features of pattern-forming dynamical systems, including multistability, abrupt phase transitions, crises, and intermittency.

Dynamic Patterns brings together different aspects of this approach to the study of human behavior, using simple experimental examples and illustrations to convey essential concepts, strategies, and methods, with a minimum of mathematics.



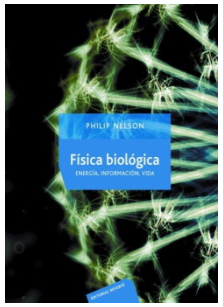
DYNAMICAL SYSTEMS IN NEUROSCIENCE: THE GEOMETRY OF EXCITABILITY AND BURSTING. Eugene M. Izhikevich

The book introduces dynamical systems, starting with one- and two-dimensional Hodgkin-Huxley-type models and continuing to a description of bursting systems. Each chapter proceeds from the simple to the complex, and provides sample problems at the end. The book explains all necessary mathematical concepts using geometrical intuition; it includes many figures and few equations, making it especially suitable for non-mathematicians. Each concept is presented in terms of both neuroscience and mathematics, providing a link between the two disciplines.



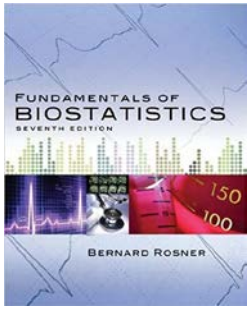
EPIDEMIOLOGY: AN INTRODUCTION. Kenneth J. Rothman

Epidemiology has developed into a vibrant scientific discipline that brings together the social and biological sciences, incorporating everything from statistics to the philosophy of science in its aim to study and track the distribution and determinants of health events. The second edition of this essential introduction to epidemiology presents the core concepts in a unified approach that aims to cut through the fog and elucidate the fundamental concepts. The book presents basic epidemiologic principles and concepts in a coherent and straightforward exposition. By emphasizing a unifying set of ideas, students will develop a strong foundation for understanding the principles of epidemiologic research.



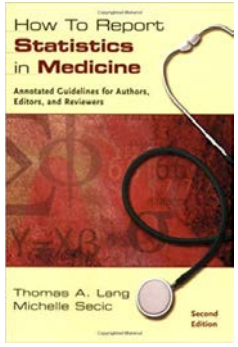
FÍSICA BIOLÓGICA: ENERGÍA, INFORMACIÓN, VIDA. Philip Nelson

Este texto ha sido redactado pensando en una gran diversidad de públicos. Su principal auditorio serán los estudiantes de las licenciaturas de Física, Biología, Bioquímica, Biofísica, Ciencia de Materiales, e Ingenierías Química, Mecánica y Bioingeniería que hayan cursado un año de introducción a la física y al análisis matemático. En secciones adicionales, ofrece material avanzado para estudiantes de segundo y tercer ciclo.



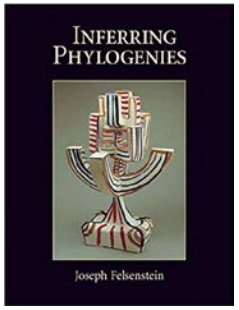
FUNDAMENTALS OF BIOSTATISTICS. Bernard Rosner

Bernard Rosner's FUNDAMENTALS OF BIOSTATISTICS is a practical introduction to the methods, techniques, and computation of statistics with human subjects. It prepares students for their future courses and careers by introducing the statistical methods most often used in medical literature. Rosner minimizes the amount of mathematical formulation (algebra-based) while still giving complete explanations of all the important concepts. As in previous editions, a major strength of this book is that every new concept is developed systematically through completely worked out examples from current medical research problems.



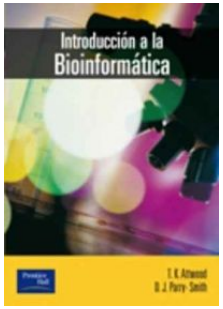
HOW TO REPORT STATISTICS IN MEDICINE: ANNOTATED GUIDELINES FOR AUTHORS, EDITORS, AND REVIEWERS. Thomas A. Lang, Michelle Secic.

How to Report Statistics in Medicine presents a comprehensive and comprehensible set of guidelines for reporting the statistical analyses and research designs and activities commonly used in biomedical research. Containing elements of a reference book, a style manual, a dictionary, an encyclopedia, and a text book, it is the standard guide in the fields of medical writing, scientific publications, and evidence-based medicine throughout the world.



INFERRING PHYLOGENIES. Joseph Felsenstein

Phylogenies, or evolutionary trees, are the basic structures necessary to think about and analyze differences between species. Statistical, computational, and algorithmic work in this field has been ongoing for four decades now, and there have been great advances in understanding. Yet no book had summarized this work. Inferring Phylogenies does just that in a single, compact volume. Phylogenies are inferred with various kinds of data. This book concentrates on some of the central ones: discretely coded characters, molecular sequences, gene frequencies, and quantitative traits. Also covered are restriction sites, RAPDs, and microsatellites.

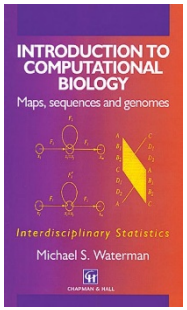


INTRODUCCIÓN A LA BIOINFORMÁTICA. Teresa K. Attwood, David J. Parry-Smith

El objetivo de los autores es fomentar una aproximación meditada al análisis de secuencias y destacar los conceptos subyacentes pues, en este área de imparable desarrollo, los detalles cambian muy rápidamente.

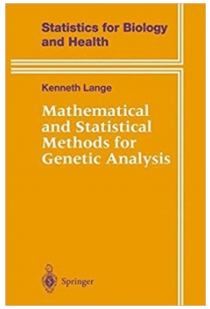
INTRODUCTION AUX MODÉLISATIONS MATHÉMATIQUES POUR LES SCIENCES DU VIVANT. Jacques Istas

Le but de cet ouvrage est de présenter un panorama de différentes méthodes mathématiques utilisées pour la modélisation de phénomènes issus du vivant. Nous avons voulu être le plus large possible, incluant ainsi à la fois les méthodes déterministes (systèmes dynamiques, théorie des jeux) et les méthodes stochastiques (processus aléatoires, statistiques). Chaque modèle mathématique proposé est accompagné d'un exemple concret éclairant la modélisation retenue.



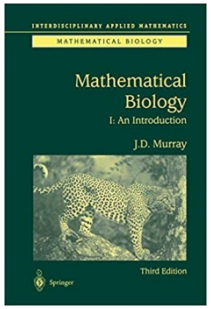
INTRODUCTION TO COMPUTATIONAL BIOLOGY: MAPS, SEQUENCES AND GENOMES. Michael S. Waterman

Introduction to Computational Biology exposes the reader to the fascinating structure of biological data and explains how to treat related combinatorial and statistical problems. Written to describe mathematical formulation and development, this book helps set the stage for even more, truly interdisciplinary work in biology.



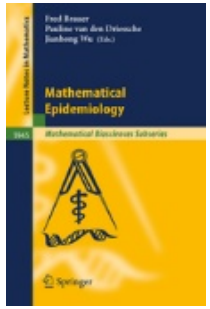
MATHEMATICAL AND STATISTICAL METHODS FOR GENETIC ANALYSIS. Kenneth Lange

Mathematical and Statistical Methods for Genetic Analysis is written to equip graduate students in the mathematical sciences to understand and model the epidemiological and experimental data encountered in genetics research. Mathematical, statistical, and computational principles relevant to this task are developed hand in hand with applications to gene mapping, risk prediction, and the testing of epidemiological hypotheses. The book includes many topics currently accessible only in journal articles, including pedigree analysis algorithms, Markov chain Monte Carlo methods, reconstruction of evolutionary trees, radiation hybrid mapping, and models of recombination. Exercise sets are included.



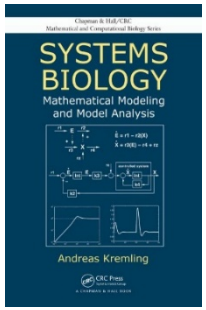
MATHEMATICAL BIOLOGY. J. D. Murray

Due to this tremendous development in recent years, for this new edition Murray is covering certain items in depth, giving new applications such as modelling marital interaction, growth of cancer tumours, temperature sex determination, wolf territoriality, wolf-deer survival etc. In other areas he discusses basic modelling concepts and provides further references as needed. The book continues to present a broad view of the field of theoretical and mathematical biology and gives us an excellent background from which to begin genuine interdisciplinary research in the biomedical sciences.



MATHEMATICAL EPIDEMIOLOGY. Fred Brauer, Pauline van den Driessche, Jianhong Wu

Based on lecture notes of two summer schools with a mixed audience from mathematical sciences, epidemiology and public health, this volume offers a comprehensive introduction to basic ideas and techniques in modeling infectious diseases, for the comparison of strategies to plan for an anticipated epidemic or pandemic, and to deal with a disease outbreak in real time. It covers detailed case studies for diseases including pandemic influenza, West Nile virus, and childhood diseases. Models for other diseases including Severe Acute Respiratory Syndrome, fox rabies, and sexually transmitted infections are included as applications.

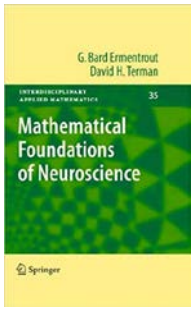


MATHEMATICAL MODELING OF BIOLOGICAL SYSTEMS. Andreas Deutsch

This edited volume contains a selection of chapters that are an outgrowth of the - ropean Conference on Mathematical and Theoretical Biology (ECMTB05, Dresden, Germany, July 2005). The peer-reviewed contributions show that mathematical and computational approaches are absolutely essential for solving central problems in the life sciences, ranging from the organizational level of individual cells to the dynamics of whole populations.

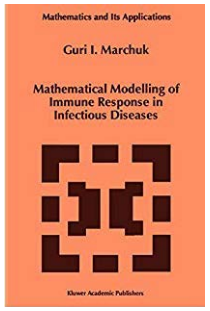
MATHEMATICAL MODELS IN BIOLOGY: AN INTRODUCTION. Elizabeth S. Allman, John A. Rhodes

This introductory textbook on mathematical biology focuses on discrete models across a variety of biological subdisciplines. Biological topics treated include linear and non-linear models of populations, Markov models of molecular evolution, phylogenetic tree construction, genetics, and infectious disease models. The coverage of models of molecular evolution and phylogenetic tree construction from DNA sequence data is unique among books at this level. Computer investigations with MATLAB are incorporated throughout, in both exercises and more extensive projects, to give readers hands-on experience with the mathematical models developed. MATLAB programs accompany the text.



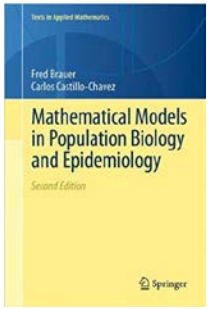
MATHEMATICAL FOUNDATIONS OF NEUROSCIENCE. Bard Ermentrout, David H. Terman

Arising from several courses taught by the authors, this book provides a needed overview illustrating how dynamical systems and computational analysis have been used in understanding the types of models that come out of neuroscience.



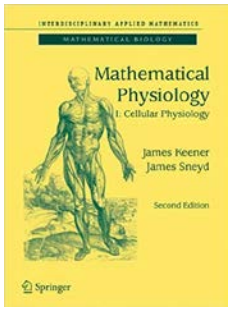
MATHEMATICAL MODELLING OF IMMUNE RESPONSE IN INFECTIOUS DISEASES. Guri I. Marchuck

Beginning his work on the monograph to be published in English, this author tried to present more or less general notions of the possibilities of mathematics in the new and rapidly developing science of infectious immunology, describing the processes of an organism's defence against antigen invasions. The results presented in this monograph are based on the construc tion and application of closed models of immune response to infections which makes it possible to approach problems of optimizing the treat ment of chronic and hypertoxic forms of diseases.



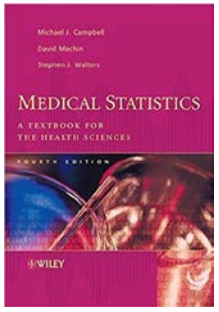
MATHEMATICAL MODELS IN POPULATION BIOLOGY AND EPIDEMIOLOGY. Fred Brauer, Carlos Castillo-Chávez

This book is an introduction to the principles and practice of mathematical modeling in the biological sciences, concentrating on applications in population biology, epidemiology, and resource management. The core of the book covers models in these areas and the mathematics useful in analyzing them, including case studies representing real-life situations. The emphasis throughout is on describing the mathematical results and showing students how to apply them to biological problems while highlighting some modeling strategies. A large number and variety of examples, exercises, and projects are included. Additional ideas and information may be found on a web site associated with the book.



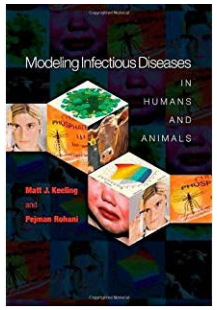
MATHEMATICAL PHYSIOLOGY. James Keener, James Sneyd

Divided into two volumes, the book begins with a pedagogical presentation of some of the basic theory, with chapters on biochemical reactions, diffusion, excitability, wave propagation and cellular homeostasis. The second, more extensive part discusses particular physiological systems, with chapters on calcium dynamics, bursting oscillations and secretion, cardiac cells, muscles, intercellular communication, the circulatory system, the immune system, wound healing, the respiratory system, the visual system, hormone physiology, renal physiology, digestion, the visual system and hearing.



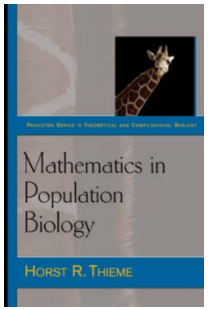
MEDICAL STATISTICS: A TEXTBOOK FOR THE HEALTH SCIENCES. Michael J. Campbell, David Machin, Stephen J. Walters

Provides students and practitioners with a clear, conciseintroduction to the statistics they will come across in theirregular reading of clinical papers.



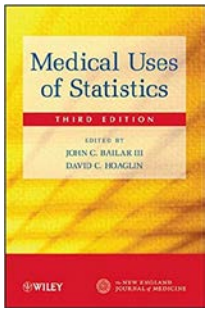
MODELING INFECTIOUS DISEASES IN HUMANS AND ANIMALS. Matt J. Keeling and pejman Rohani

For epidemiologists, evolutionary biologists, and health-care professionals, real-time and predictive modeling of infectious disease is of growing importance. This book provides a timely and comprehensive introduction to the modeling of infectious diseases in humans and animals, focusing on recent developments as well as more traditional approaches.



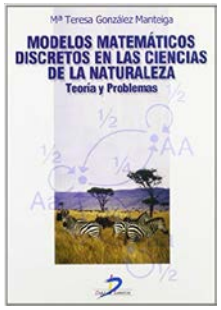
MATHEMATICS IN POPULATION BIOLOGY. Horst R. Thieme

The formulation, analysis, and re-evaluation of mathematical models in population biology has become a valuable source of insight to mathematicians and biologists alike. This book presents an overview and selected sample of these results and ideas, organized by biological theme rather than mathematical concept, with an emphasis on helping the reader develop appropriate modeling skills through use of well-chosen and varied examples.



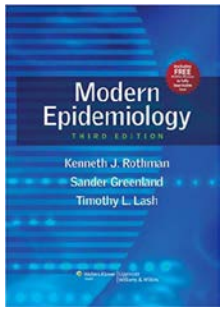
MEDICAL USES OF ESTATISTICS. edited by John C. Bailar III and David C. Hoaglin

Medical Uses of Statistics has served as one of the mostinfluential works on the subject for physicians,physicians-in-training, and a myriad of healthcare experts who needa clear idea of the proper application of statistical techniques inclinical studies as well as the implications of theirinterpretation for clinical practice. This *Third Edition*maintains the focus on the critical ideas, rather than themechanics, to give practitioners and students the resources theyneed to understand the statistical methods they encounter in modernmedical literature.



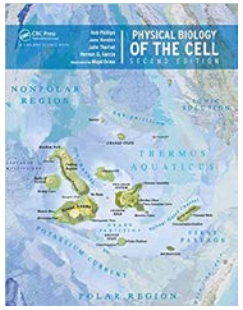
MODELOS MATEMÁTICOS DISCRETOS EN LAS CIENCIAS DE LA NATURALEZA: TEORÍA Y PROBLEMAS. Mª Teresa González Manteiga

El propósito principal es este libro, que consta de siete capítulos, es el estudio teórico-práctico de algunos modelos matemáticos discretos en las ciencias de la naturaleza. Se dedica un primer capítulo a una breve presentación general de aportaciones de las matemáticas a las ciencias naturales, señalando algunos modelos matemáticos generados por problemas de la biología, así como aplicaciones a las ciencias de la naturaleza de modelos matemáticos que no han tenido su origen en problemas de la Ciencia.



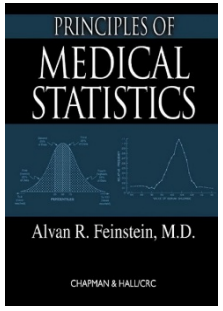
MODERN EPIDEMIOLOGY. Kenneth J. Rothman, Sander Greenland, and Timothy L. Lash

The book covers a broad range of concepts and methods, such as basic measures of disease frequency and associations, study design, field methods, threats to validity, and assessing precision. It also covers advanced topics in data analysis such as Bayesian analysis, bias analysis, and hierarchical regression. Chapters examine specific areas of research such as disease surveillance, ecologic studies, social epidemiology, infectious disease epidemiology, genetic and molecular epidemiology, nutritional epidemiology, environmental epidemiology, reproductive epidemiology, and clinical epidemiology.



PHYSICAL BIOLOGY OF THE CELL. Rob phillips, Jane Kondev, Julie Theriot

Physical Biology of the Cell is a textbook for a first course in physical biology or biophysics for undergraduate or graduate students. It maps the huge and complex landscape of cell and molecular biology from the distinct perspective of physical biology. As a key organizing principle, the proximity of topics is based on the physical concepts that unite a given set of biological phenomena. Herein lies the central premise: that the appropriate application of a few fundamental physical models can serve as the foundation of whole bodies of quantitative biological intuition, useful across a wide range of biological problems.

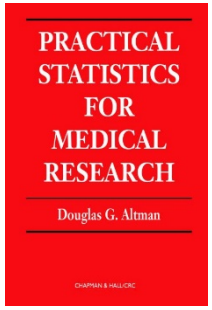


PRINCIPLES OF MEDICAL STATISTICS. Alvan R. Feinstein

The get-it-over-with-quickly approach to statistics has been encouraged - and often necessitated - by the short time allotted to it in most curriculums. If included at all, statistics is presented briefly, as a task to be endured mainly because pertinent questions may appear in subsequent examinations for licensure or other certifications. However, in later professional activities, clinicians and biomedical researchers will constantly be confronted with reports containing statistical expressions and analyses.

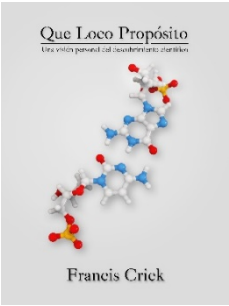
PHASE RESETTING IN MEDICINE AND BIOLOGY: STOCHASTIC MODELLING AND DATA ANALYSIS. Peter A. Tass

Synchronization processes are of great interest and importance in biology, medicine and physics. In particular, for the comprehension of brain function ing it appears inevitable that one should analyze neuronal synchronization processes. This book presents a new understanding of how a stimulus in fluences synchronization patterns of a population of oscillators. On the one hand, a variety of stimulation-induced dynamical phenomena will be pre sented; on the other hand, new data analysis tools will be developed which will serve as a link between theory and experiment.



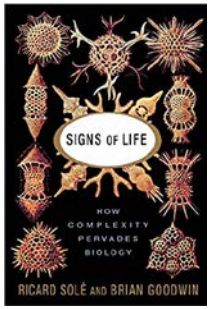
PRACTICAL STATISTICS FOR MEDICAL RESEARCH. Douglas G. Altman

Practical Statistics for Medical Research is a problem-based text for medical researchers, medical students, and others in the medical arena who need to use statistics but have no specialized mathematics background.



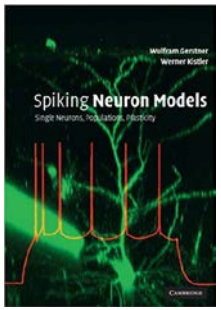
QUE LOCO PROPÓSITO: UNA VISIÓN PERSONAL DE DESCUBRIMIENTO CIENTÍFICO. Francis Crick

Que loco Propósito. Una visión personal del descubrimiento científico, originalmente What Mad Pursuit: A Personal View of Scientific Discovery es un libro publicado en 1988 escrito por Francis Crick, el codescubridor de la estructura del ADN en 1953, un descubrimiento crítico en la historia de la ciencia, Crick muestra las pistas e intuiciones tanto provechosas como ralentizadoras, que les llevaron a este descubrimiento de la estructura del ADN y a otros muchos. Valorando que ayuda y que entorpece en la búsqueda del conocimiento científico.



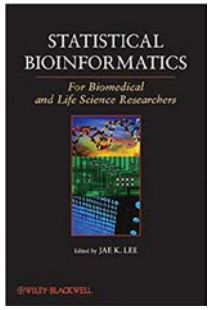
SIGNS OF LIFE: HOW COMPLEXITY PERVADES BIOLOGY. Ricard Solé and Brian Goodwin

Signs of Life applies the mathematics of order and disorder, of entropy, chance, and randomness, of chaos and nonlinear dynamics to the various mysteries of the living world at all levels. This book is an entirely new approach to understanding living systems and will help set the agenda for biology in the coming century.



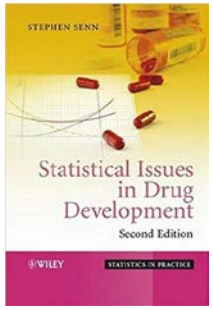
SPIKING NEURON MODELS: SINGLE NEURONS, POPULATIONS, PLASTICITY. Wulfram Gerstner, Werner M. Kistler

This introduction to spiking neurons can be used in advanced-level courses in computational neuroscience, theoretical biology, neural modeling, biophysics, or neural networks. It focuses on phenomenological approaches rather than detailed models in order to provide the reader with a conceptual framework. The authors formulate the theoretical concepts clearly without many mathematical details. While the book contains standard material for courses in computational neuroscience, neural modeling, or neural networks, it also provides an entry to current research. No prior knowledge beyond undergraduate mathematics is required.



STATISTICAL BIOINFORMATICS: A GUIDE FOR LIFE AND BIOMEDICAL SCIENCE RESEARCHERS. edited by Jae K. Lee

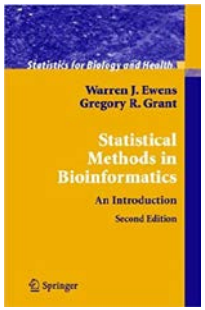
This book provides an essential understanding of statistical concepts necessary for the analysis of genomic and proteomic data using computational techniques. The author presents both basic and advanced topics, focusing on those that are relevant to the computational analysis of large data sets in biology. The book starts with an introduction to probability and statistics for genome-wide data, and moves into topics such as clustering, classification, multi-dimensional visualization, experimental design, statistical resampling, and statistical network analysis.



STATISTICAL ISSUES IN DRUG DEVELOPMENT. Stephen Senn

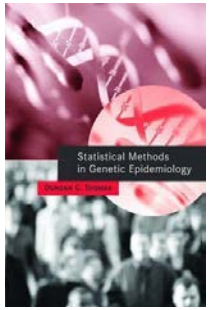
Drug development is the process of finding and producing therapeutically useful pharmaceuticals, turning them into safe and effective medicine, and producing reliable information regarding the appropriate dosage and dosing intervals.

Statistical Issues in Drug Development presents an essential and thought provoking guide to the statistical issues and controversies involved in drug development.



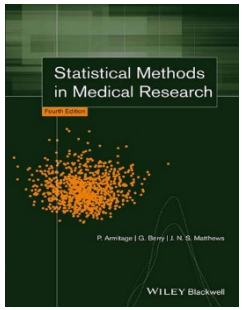
STATISTICAL METHODS IN BIOINFORMATICS: AN INTRODUCTION. Warren J. Ewens, Gregory R. Grant

The book is written so as to appeal to biologists and computer scientists who wish to know more about the statistical methods of the field, as well as to trained statisticians who wish to become involved with bioinformatics. The earlier chapters introduce the concepts of probability and statistics at an elementary level, but with an emphasis on material relevant to later chapters and often not covered in standard introductory texts. Later chapters should be immediately accessible to the trained statistician.



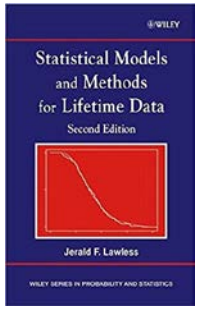
STATISTICAL METHODS IN GENETIC EPIDEMIOLOGY. Duncan C. Thomas

This well-organized and clearly written text has a unique focus on methods of identifying the joint effects of genes and environment on disease patterns. It follows the natural sequence of research, taking readers through the study designs and statistical analysis techniques for determining whether a trait runs in families, testing hypotheses about whether a familial tendency is due to genetic or environmental factors or both, estimating the parameters of a genetic model, localizing and ultimately isolating the responsible genes, and finally characterizing their effects in the population.



STATISTICAL METHODS IN MEDICAL RESEARCH. P. Armitage, G. Berry

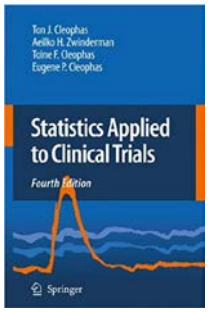
The explanation and implementation of statistical methods for themedical researcher or statistician remains an integral part ofmodern medical research. This book explains the use of experimentaland analytical biostatistics systems. Its accessible style allowsit to be used by the non-mathematician as a fundamental componentof successful research.



STATISTICAL MODELS AND METHODS FOR LIFETIME DATA. Jerald F. Lawless

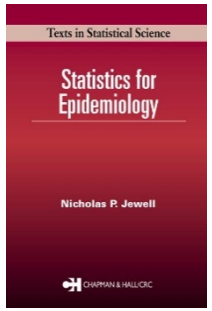
The statistical analysis of lifetime or response time data is a keytool in engineering, medicine, and many other scientific andtechnological areas. This book provides a unified treatment of themodels and statistical methods used to analyze lifetime data.

Equally useful as a reference for individuals interested in theanalysis of lifetime data and as a text for advanced students,Statistical Models and Methods for Lifetime Data, Second Editionprovides broad coverage of the area without concentrating on anysingle field of application. Extensive illustrations and examplesdrawn from engineering and the biomedical sciences provide readerswith a clear understanding of key concepts.



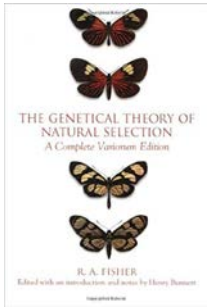
STATISTICS APPLIED TO CLINICAL TRIALS. Ton J. Cleophas, Aeilko H. Zwinderman and Toine F. Cleophas

The answers given by randomized controlled trials constitute at present the way how patients should be clinically managed. In the setup of such randomized trial one of the most important issues is the statistical basis. The randomized trial will never work when the statistical grounds and analyses have not been clearly defined beforehand. All endpoints should be clearly defined in order to perform appropriate power calculations. Based on these power calculations the exact number of available patients can be calculated in order to have a sufficient quantity of individuals to have the predefined questions answered. Therefore, every clinical physician should be capable to understand the statistical basis of well performed clinical trials.



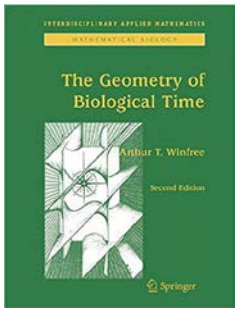
STATISTICS FOR EPIDEMIOLOGY. Nicholas P. Jewell

Statistical ideas have been integral to the development of epidemiology and continue to provide the tools needed to interpret epidemiological studies. Although epidemiologists do not need a highly mathematical background in statistical theory to conduct and interpret such studies, they do need more than an encyclopedia of "recipes."



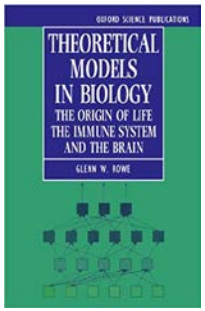
THE GENETICAL THEORY OF NATURAL SELECTION: A COMPLETE VARIORUM EDITION. R. A. Fisher

R A Fisher's classic The Genetical Theory of Natural Selection was first published by the Oxford University Press in 1930. It was the first attempt to assess and explain Darwin's evolutionary theories in terms of the genetic processes underlying them, and was also original in being the first book to establish a firm theoretical basis for evolution. Since then, it has become a classic text in evolutionary biology, with Fisher hailed as one of the greatest evolutionary biologists of this century.



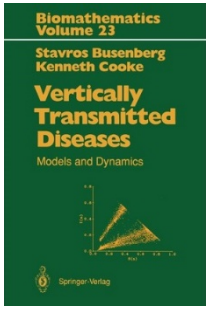
THE GEOMETRY OF BIOLOGICAL TIME. Arthur T. Winfree

The Geometry of Biological Time describes periodic processes in living systems and their non-living analogues in the abstract terms of nonlinear dynamics. Enphasis is given in phase singularities, waves, and mutual synchronization in tissues composed of many clocklike units. Also provided are descriptions of the best-studied experimental systems such as chemical oscillators, pacemaker neurons, circadian clocks, and excitable media organized into biochemical and bioelectrical wave patterns in two and three dimensions.



THEORETICAL MODELS IN BIOLOGY: THE ORIGIN OF LIFE, THE IMMUNE SYSTEM, AND THE BRAIN. Glenn Rowe

This book surveys theoretical models in three broad areas of biology (the origin of life, the immune system, and memory in the brain), introducing mathematical and (mainly) computational models that have been used to construct simulations. This book is important becuase it shows how the power of modern computers is allowing researchers in theoretical biology tobreak free of the constraints on modelling that were imposed by the traditional differential equation approach.

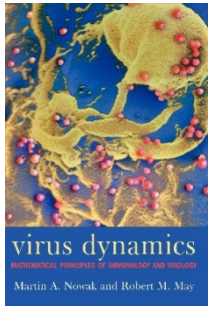


VERTICALLY TRANSMITED DISEASES: MODELS AND DYNAMICS. Stavros Busenberg, Kenneth Cooke

Infectious diseases are transmitted through various different mechanisms including person to person interactions, by insect vectors and via vertical transmission from a parent to an unborn offspring. The population dynamics of such disease transmission can be very complicated and the development of rational strategies for controlling and preventing the spread of these diseases requires careful modeling and analysis. The book describes current methods for formulating models and analyzing the dynamics of the propagation of diseases which include vertical transmission as one of the mechanisms for their spread.

TUTORIALS IN MATHEMATICAL BIOSCIENCES.

It is intended primarily as a graduate text or a research reference. It will serve as a concise and up-to-date introduction to all those who wish to learn about the state of calcium dynamics modeling, and how such models are applied to physiological questions.



VIRUS DYNAMICS: MATHEMATICAL PRINCIPLES OF IMMUNOLOGY AND VIROLOGY. Martin A. Nowark, Robert M. May

Martin Nowak and Robert M May describe the emerging field of theoretical immunology in this accessible and well- written text. Using mathematical modelling techniques, the authors set out their ideas about how populations of viruses and populations of immune system cells may interact in various circumstances, and how infectious diseases spread within patients. They explain how this approach to understanding infectious diseases can reveal insights into the dynamics of viral and other infections, and the interactions between infectious agents and immune responses.

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